BRITISH JOURNAL OF HOSPITAL MEDICINE

CASE REPORT

A Case Report of *Neisseria sicca* Endocarditis in a Patient with Tissue Aortic Valve: Favorable Outcome Following Prompt Multidisciplinary Team Management

Husam Jamil[1,*], Talal Ezzo[2], Aymen Doumi[3], Zeinab Abdallah Elias Diab[3], Anum Saleem[4]

[1]Acute Medicine, Yorkshire and Humber Deanery, Leeds, UK
[2]Cardiology, Calderdale and Huddersfield Foundation Trust, Halifax, UK
[3]Acute Medicine, Yorkshire and Humber Deanery, Hull, UK
[4]Microbiology, Calderdale and Huddersfield Foundation Trust, Halifax, UK
*Correspondence: h.jamil@nhs.net (Husam Jamil)

Abstract

Neisseria sicca is commonly found in oral flora and is usually deemed harmless. *Neisseria sicca* is very rarely associated with infective endocarditis and has a high mortality rate with it. We present a case of infective endocarditis in a 57-year-old male who presented with fever, lethargy, and reduced mobility and was admitted to an acute medical unit of a UK district general hospital. Serial blood cultures grew *Neisseria sicca* and transoesophageal echocardiography confirmed vegetation on the aortic valve. As per microbiology advice, his antibiotic treatment was adjusted to oral ciprofloxacin and intravenous ceftriaxone for 6 weeks given this organism's sensitivity. The cardiology team arranged outpatient appointments for long-term follow-ups. Involving acute medicine, microbiology, and cardiology teams as part of a multidisciplinary team (MDT) led to good clinical outcomes and patients remained alive and well on follow-ups. So far only 27 cases have been documented and we think our work would increase insights into management strategies for this condition particularly the utilization of the MDT approach.

Key words: infective endocarditis; *Neiserria sicca*; transoesophageal echocardiography; blood culture; multidisciplinary team management; case report

Submitted: 17 October 2024 Revised: 25 November 2024 Accepted: 28 November 2024

Introduction

Infective endocarditis (IE) has an annual incidence of 5 cases per 100,000 and carries mortality as high as 30% (Cahill et al, 2017). It has multiple risk factors. Gram-positive organisms are more commonly associated with IE. The causes, clinical features, and possibility of developing complications in infective endocarditis are variable hence adding to the challenges in management.

Neisseria sicca is a gram-negative diplococcus that is an exceptionally uncommon pathogen to cause IE. Risk factors include patients with immunocompromise, poor dentition, replaced heart valves, and intravenous (IV) drug use. 90% (Cheng et al, 2024) of such cases had experienced catastrophic embolic events hence mortality is high.

In this case report we present another rare instance of infective endocarditis caused by *Neisseria sicca*. The patient experienced a positive clinical outcome

How to cite this article:
Jamil H, Ezzo T, Doumi A, Diab ZAE, Saleem A. A Case Report of *Neisseria Sicca* Endocarditis in a Patient with Tissue Aortic Valve: Favorable Outcome Following Prompt Multidisciplinary Team Management. Br J Hosp Med. 2025. https://doi.org/10.12968/hmed.2024.0774

following a multidisciplinary team (MDT) management approach. The case report was written according to the care checklist (**Supplementary Material**).

Case Report

A 57-year-old Caucasian male presented to the emergency department of a district general hospital in the UK with primary complaints of lethargy and a high fever, which had led to reduced mobility over the last three days. There was no recent history of respiratory tract infection. His medical history included aortic valve replacement using a 23 mm Edward Perimount Magna biological proesthetic valve for severe aortic regurgitation and infective endocarditis, two years earlier. His regular medication included aspirin, and he had previous thrombocytopenia associated with linezolid use.

On examination, he had a temperature of 38.6 °C, with normal blood pressure and heart rate. A soft systolic murmur was noted, but there were no signs of splinter hemorrhages, skin changes, Janeway's lesions, conjunctival hemorrhages, or peripheral edema. Other physical examinations were unremarkable. Laboratory investigations revealed an elevated white cell count of 17.4×10^9/L (normal range $3.5–11 \times 10^9$/L) and a C-reactive protein (CRP) level of 106 mg/L (normal range 1–10 mg/L). The liver and kidney function tests were normal. Both the electrocardiogram and chest X-ray were normal. He was started on Piperacillin-Tazobactam and admitted to the Acute Medical Unit.

Three serial blood cultures revealed *Neisseria sicca*, sensitive to ciprofloxacin and ceftriaxone. The patient was switched to these antibiotics, and Piperacillin-Tazobactam was discontinued on microbiology advice. A transthoracic echocardiogram (TTE) appeared normal, and an urgent cardiology referral was made. Subsequently, a transoesophageal echocardiogram (TOE) was performed, confirming a 5×4 mm vegetation (Fig. 1) attached to the left cusp of the aortic valve bioprosthesis.

An MDT approach involving Acute Medicine, Microbiology, and Cardiology was adopted. Microbiology recommended a six-week course of intravenous ceftriaxone (2 grams twice daily) alongside oral ciprofloxacin (500 mg twice daily). The patient remained admitted for four weeks given symptoms which were worse initially but improved after three weeks. The white cell count normalized to 9.8×10^9/L after day 3 of commencing ciprofloxacin and ceftriaxone. The CRP however showed a more gradual improvement and dropped to normal limits after 4 weeks of IV ceftriaxone. A repeat blood culture taken 10 days after starting antibiotics showed no growth.

A peripherally inserted central catheter (PICC) was placed to facilitate the outpatient administration of ceftriaxone to complete the six-week course. The PICC nursing line care and administration of antibiotics was arranged by the outpatient parenteral antibiotic therapy (OPAT) team of microbiology.

Cardiology follow-up appointments were arranged, but as his clinical symptoms, blood culture results, and infection markers had improved, no further TOE was scheduled.

The patient completed the six-week course of antibiotics and was alive and well at his cardiology follow-up review two months after admission. A further follow-up four weeks later was planned by the Cardiology team.

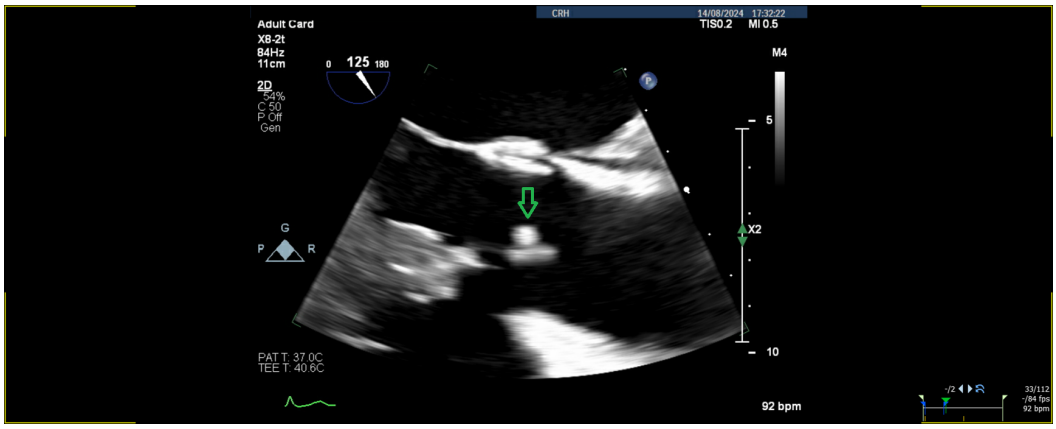

Fig. 1. A transoesophageal echocardiography image of a long axis view of the aortic valve showing a 5 × 4 mm rounded vegetation (green arrow) attached to the left coronary cusp. Aortic valve bioprosthesis is well seated with no regurgitation.

Discussion

There are only 27 reported cases of *Neisseria sicca* endocarditis in the literature (Cheng et al, 2024) and the exact incidence remains undocumented. *Neisseria sicca* is a commensal bacterium that inhabits the oral flora (Leone et al, 2012) and the respiratory tract. It is a Gram-negative diplococcus that belongs to the Neisseriaceae (Sommerstein et al, 2013), and is often classified as "non-pathogenic" Neisseria. Other reported infections associated with this bacterium include peritonitis, meningitis, pneumonia, and conjunctivitis (Zhang et al, 2024).

Risk factors include intravenous drug users, poor dental hygiene and dental procedures (Pilmis et al, 2014), underlying heart disease and prosthetic valves. In our patient's case, the relevant risk factor was a bioprosthetic aortic valve replacement. In IV drug use cases of IE by *N. sicca*, one of the mechanisms explained is the cleaning of the needle by the tongue (Szendrey et al, 2023) prior to injection.

Globally, rarer pathogens from Neisseria genus causing IE include *N. subflava*, *N. lactamica*, *N. elongate*, *N. cinerea*, *N. skkuensis*, *N. mucosa*, *N. mucosa* and *N. sicca* appear phenotypically the same (Walsh et al, 2023). *N. elongata* and *N. mucosa* (38.4% and 36.4% respectively) are more common in reported IE cases among the above species.

Symptomatology in reported cases of *N. sicca* is similar to common pathogens implicated in the disease but in more than 90% (Sommerstein et al, 2013) of reported cases, embolic phenomena were observed. The exact mechanism of embolic phenomena remains less understood. Our patient did not have any embolic phenomena.

The MDT consisted of acute medicine, microbiology, and cardiology and remained vital in the management of this case. The acute medicine team was the front-line team in performing initial investigations and making appropriate referrals. The microbiology team gave advice on correct antibiotic choice based on culture sensitivities and formulated follow-up plans via OPAT. The cardiology team arranged TOE and took over care of ongoing follow-ups for surveillance of valve function. Communications took place over the phone and all plans were documented and available on an online electronic patient record system for all teams.

TOE is a better diagnostic modality for detecting IE vegetations (96%–100%) compared to TTE (77%) (Locke et al, 2022; Reynolds et al, 2003). The indications (Sordelli et al, 2019) of performing TOE for the workup of IE include the presence of intracardiac device leads, positive TTE, and negative TTE in the presence of IE complications. If TOE is negative but clinical suspicion for IE remains high, a repeat TOE is suggested. Our patient had an initial negative TTE followed by a TOE showing vegetation in aortic valve (Fig. 1).

As *N. sicca* is uncommon in immunocompetent individuals, there are no European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidelines on the interpretation of sensitivity tests (EUCAST, 2024). Sensitivity interpretation was therefore taken from the Neisseria meningitidis EUCAST guidelines. The *Neisseria sicca* isolate was found to be susceptible to ceftriaxone, meropenem, and ciprofloxacin, and was resistant to penicillin and rifampicin. Ceftriaxone was the antibiotic of choice as it had a narrower spectrum than meropenem and could be administered as a 2 gram dose once daily making it a suitable OPAT option. *N. sicca* IE has high rates of complications, so it was decided that dual antibiotic therapy was appropriate. Ciprofloxacin was selected as the second agent; it was one of the few antibiotic options that had reliable antimicrobial susceptibility data and could be taken orally twice a day with good bioavailability making administration practical.

Our patient responded well to Ceftriaxone and Ciprofloxacin and did not undergo any surgical intervention.

Our case had diagnostic and management challenges. The clinical symptomatology of the patient was non-specific. The positive serial blood cultures for *N. sicca*, as opposed to the commonly occurring *Staphylococcus* species (35–40%) and *Streptococci* and *Enterococci* species (40–45%) as causative agents of IE (Nappi, 2024), are very atypical to consider IE and TTE was normal. *N. sicca* can be easily grown and cultured in the laboratory (Sommerstein et al, 2013) however there are no specific EUCAST guidelines for antimicrobial therapy for *N. sicca*. In contrast, *Staphylococcus* and *Streptococcus* species have clear antimicrobial guidelines on EUCAST. As the literature suggests a high incidence of embolic phenomena with *N. sicca*, a six-week course of antibiotics was adopted in MDT management.

The mortality currently remains high, mainly due to complications, such as Congestive Heart Failure and stroke (Leone et al, 2012). 23.1% of patients in the 27 documented cases died (Cheng et al, 2024). Our patient remained well after 6 week antibiotic course and has follow-up appointments with cardiology in place.

Our case report has limitations. It is a case study of a very rare organism causing IE hence evidence base is not strong. There is a lack of long-term follow-up data on recovery of cardiac function, recurrence risk, etc. More studies are needed to document epidemiology, mechanism of embolic phenomena, and biological features such as strain typing and resistance gene detection of *Neisseria sicca* in the future.

Learning Points

- *Neisseria sicca* is an uncommon cause of infective endocarditis with a high mortality rate, making it a rare but important entity that clinicians should be aware of.
- TOE is superior to TTE for detecting vegetation and must be requested if clinical suspicion of IE remains high.
- An MDT approach, involving acute physicians, microbiologists, and cardiologists, is essential for optimal management of these patients.

Availability of Data and Materials

All data generated or analyzed during this study are included in this article.

Author Contributions

HJ was project lead for conception and design and obtained patient consent, did literature search and drafted the manuscript. TE performed TOE, provided echo image. AD, ZD and AS did data analysis, manuscript editing and literature search. All authors contributed to the important editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Written consent was obtained from the patient, ethics approval was not needed as per provided NHS ethical committee document. This was done in accordance with the Declaration of Helsinki.

Acknowledgement

Not applicable.

Funding

This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://www.magonlinelibrary.com/doi/suppl/10.12968/hmed.2024.0774.

References

Cahill TJ, Baddour LM, Habib G, Hoen B, Salaun E, Pettersson GB, et al. Challenges in Infective Endocarditis. Journal of the American College of Cardiology. 2017; 69: 325–344. https://doi.org/10.1016/j.jacc.2016.10.066

Cheng Q, Zhou X, Wang P, Liu R, Liu Q. Infective Endocarditis Caused by Neisseria Sicca Species 10 Years After Mechanical Aortic Valve Implantation. Infection and Drug Resistance. 2024; 17: 2785–2791. https://doi.org/10.2147/IDR.S467854

EUCAST. EUCAST: Clinical breakpoints and dosing of antibiotics. [online] www.eucast.org. 2024. Available at: https://www.eucast.org/clinical_breakpoints (Accessed: 8 November 2024).

Leone S, Ravasio V, Durante-Mangoni E, Crapis M, Carosi G, Scotton PG, et al. Epidemiology, characteristics, and outcome of infective endocarditis in Italy: the Italian Study on Endocarditis. Infection. 2012; 40: 527–535. https://doi.org/10.1007/s15010-012-0285-y

Locke M, Smith A, Epstein LM, Niknam N, Boparai R. Pacemaker lead-related endocarditis with *Neisseria sicca*. BMJ Case Reports. 2022; 15: e249795. https://doi.org/10.1136/bcr-2022-249795

Nappi F. Native Infective Endocarditis: A State-of-the-Art-Review. Microorganisms. 2024; 12: 1481. https://doi.org/10.3390/microorganisms12071481

Pilmis B, Lefort A, Lecuit M, Join-Lambert O, Nassif X, Lortholary O, et al. Endocarditis due to Neisseria mucosa: case report and review of 21 cases: a rare and severe cause of endocarditis. The Journal of Infection. 2014; 68: 601–604. https://doi.org/10.1016/j.jinf.2014.02.007

Reynolds HR, Jagen MA, Tunick PA, Kronzon I. Sensitivity of transthoracic versus transesophageal echocardiography for the detection of native valve vegetations in the modern era. Journal of the American Society of Echocardiography. 2003; 16: 67–70. https://doi.org/10.1067/mje.2003.43

Sommerstein R, Ramsay D, Dubuis O, Waser S, Aebersold F, Vogt M. Fatal Neisseria sicca endocarditis. Infection. 2013; 41: 747–749. https://doi.org/10.1007/s15010-012-0393-8

Sordelli C, Fele N, Mocerino R, Weisz SH, Ascione L, Caso P, et al. Infective Endocarditis: Echocardiographic Imaging and New Imaging Modalities. Journal of Cardiovascular Echography. 2019; 29: 149–155. https://doi.org/10.4103/jcecho.jcecho_53_19

Szendrey JA, Asghar A, Mokraoui N, Walker D. A case of native tricuspid valve Neisseria mucosa/sicca species infective endocarditis complicated by septic pulmonary emboli. IDCases. 2023; 33: e01850. https://doi.org/10.1016/j.idcr.2023.e01850

Walsh L, Clark SA, Derrick JP, Borrow R. Beyond the usual suspects: Reviewing infections caused by typically-commensal Neisseria species. The Journal of Infection. 2023; 87: 479–489. https://doi.org/10.1016/j.jinf.2023.09.007

Zhang M, Zhang X, Yin X, Li G, Yang T, Xie D, et al. Peritoneal dialysis-associated peritonitis caused by Neisseria.sicca: A case report and literature review. Indian Journal of Medical Microbiology. 2024; 48: 100566. https://doi.org/10.1016/j.ijmmb.2024.100566